dLAN® 85 HSplus

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Aachen, February 2009

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Preface

Thank you for placing your trust in this devolo product.

The dLAN 85 HSplus allows you to set up your own home network with almost no effort. Because the clever dLAN technology transmits the data over the household electrical wiring, you do not have to lay any new cables. You do not even have to do without an electrical socket, as the dLAN 85 HSplus provides a power supply to which you can connect your terminal devices or multiple sockets as usual. The integrated mains filter significantly improves data transmission in the home network.

Surfing on the Internet is fast and secure with transfer rates of up to 85 Mbps and DESpro encryption with the dLAN 85 HSplus. It is also fully compatible with first-generation high-speed dLAN adapters (14 or 85 Mbps).

About this manual

After a brief introduction to "dLAN" and "Green IT" basics in **Chapter 1**, **Chapter 2** will cover successfully setting up your dLAN 85 HSplus. **Chapter 3** explains how to configure your dLAN network. Technical specifications, tips for bandwidth optimisation and our warranty conditions can be found in **Chapter 4** and conclude the manual.

Icons

This section contains a brief description of the icons used in this manual.

Very important note. Failure to observe this note may result in damage.

Important note that should be observed.

Additional information, background material and configuration tips for your device.

And if you are satisfied with your dLAN 85 HSplus, be sure to have a closer look at our other products which are also designed to make your connected lifestyle easier and simpler!

We hope you have just as much fun reading this manual as we had writing it. If you have any further ideas or suggestions related to our products, we would be delighted to hear from you at **support@devolo.com**!

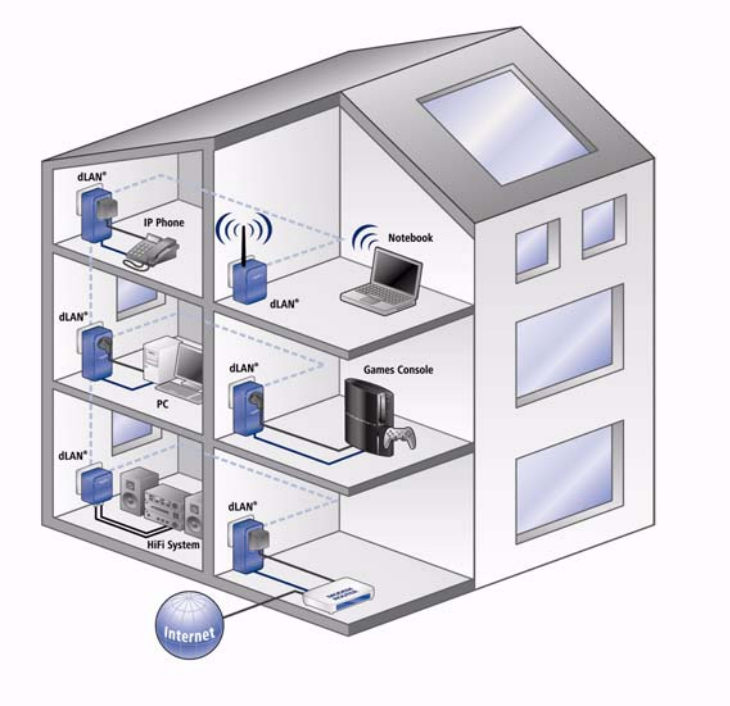
devolo on the Internet

For detailed information on our products, visit **www.devolo.com**. The download area not only contains product descriptions and documentation, but also updates of devolo software and your device's firmware.

We especially recommend the extensive devolo manuals on the topic of home networking that contain a wealth of interesting background information. These are available free of charge and can be downloaded from the **Service & Support** area of our website.

1 Introduction

dLAN is an intelligent, secure technology that lets you set up a home network easily, quickly and economically via your household electrical wiring, without the need for complex and expensive dedicated cabling. The available performance and effort required for the installation also compares favourably to traditional methods—dLAN technology now attains speeds you would expect from other LAN technologies, and installing it is a breeze!



1.1 What exactly is dLAN?

dLAN (**d**irect **L**ocal **A**rea **N**etwork) uses the household electrical wiring to transfer data between computers equipped with suitable adapters and other network components. As a result, any power outlet can be used as a network access point. The data is modulated prior to transfer and sent as a signal via household power lines. State-of-the-art technology ensures that the power and data net-

works do not interfere with one another. Networking via dLAN is fast and secure. The data is encrypted using a key to prevent interception by third parties.

1.2 devolo—Up to speed on green IT

The topic everyone is talking about is **green IT**. devolo has an easy solution: the power saving mode, which comes standard with the home network adapters, sets the company apart from many competitors in the IT industry. And that has been the case even before global warming and the scarcity of resources have become concerns on everyone's mind.

Developers at devolo, have for a long time kept a close eye on how much power dLAN adapters may consume. After all, a devolo network via electrical sockets should not only be convenient, but also require as little energy as possible—particularly during times when it is not being used.

That devolo can satisfy the demand for energy efficiency is evidenced by the patented **power saving mode** in the devices. **It automatically lowers energy consumption by 30 – 50 %** when the computers in the dLAN network or connected equipment are switched off.

The power saving mode in the adapters is not only a tribute to **environmental protection** but also a real service to the customer. Most people tend to forget to regularly press the standby button on the hardware. **The patented technology in devolo adapters allows you to save energy without having to do anything**. And if less energy is consumed, your electric meter will turn more slowly. In other words, every minute the adapter is in power saving mode, you will save money.

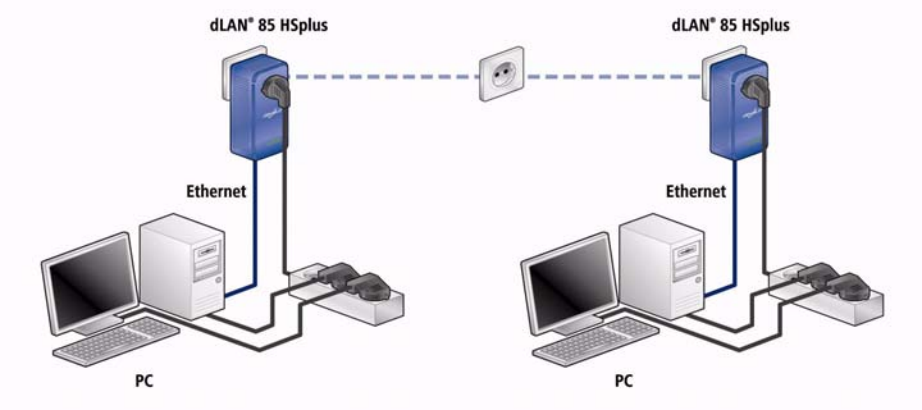
A dLAN adapter connected to a computer can only go into power saving mode if the network card of the switched-off computer is also inactive. If you are using a network card that remains active even when the computer is switched off, we recommend connecting the computer to an on/off switch using a multiple socket so that both the computer and the integrated network card are de-energised.

1.3 The dLAN 85 HSplus at a glance

- The dLAN 85 HSplus quickly and easily establishes a network connection over the household electrical wiring.
- Simple plug-and-play connection between the routers, computers and other network-compatible devices!
- The integrated electrical socket enables additional terminal devices or multiple sockets to be connected to the adapter just as a normal wall socket—no power supply is lost.
- The integrated mains filter significantly improves data transmission in the home network.
- The "Quality of Service" function and transfer rates of up to 85 Mbps are enough for bandwidth-hungry applications, e. g. online gaming, VoIP telephony and Internet media. Automatic data prioritisation ensures interference-free reproduction of voice and video data.
- Reduced energy consumption with patented power save mode (see Section 1.2 'devolo—Up to speed on green IT'), i.e. if no data transmission is taking place, the energy consumption is automatically decreased by 30 %.
- No configuration is necessary—plug the dLAN 85 HSplus into the power outlet, connect it to your computer via the network cable and you are ready to go!
- Full compatibility with devolo adapters of the first dLAN generation (14 or 85 Mbps).
- User-friendly software for PC (Windows XP/Windows Vista), Mac and Linux allows individual network encryption for even more security.

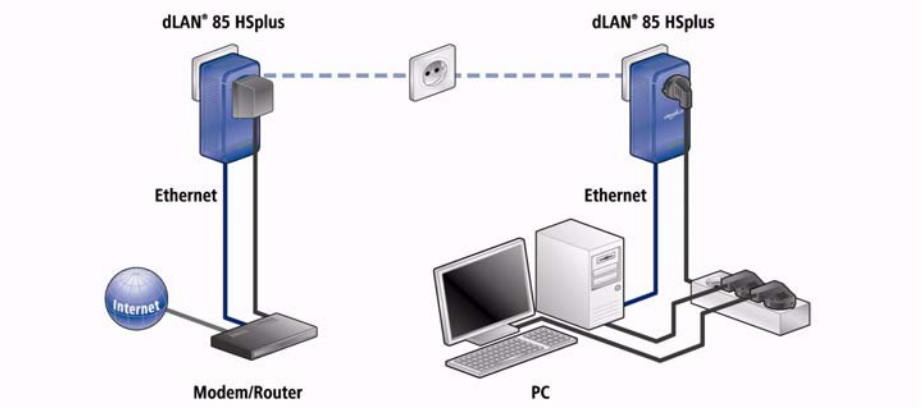
1.4 Sample applications

1.4.1 Networking between two computers



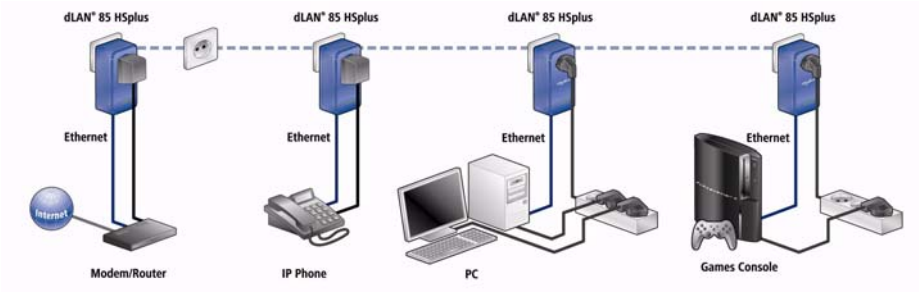
1.4.2 Internet standalone solution

Extending Internet over the electrical wiring



1.4.3 Internet multiple installation solution

Networking IP telephone and computer; online gaming over the electrical wiring



For additional application scenarios, as well as answers to frequently asked questions (FAQs) about dLAN networks, visit our website at www.devolo.com.

2 Initial use

This chapter covers everything you need to know to set up your dLAN 85 HSplus. It will explain connecting the dLAN 85 HSplus and its functions. We will also introduce the included devolo software and guide you through its installation.

2.1 Package contents

Please ensure that the delivery is complete before beginning with the installation of your dLAN 85 HSplus: The following components are included in the scope of delivery:

- dLAN 85 HSplus (Starterkit: 2 dLAN 85 HSplus)
- Network cable (Starterkit: 2 network cable)
- Printed information leaflet
- CD containing software and online documentation

devolo AG reserves the right to change the package contents without prior notice.

2.2 System requirements

- Operating systems: Windows XP (32 bit), Windows Vista (32/64 bit), Linux, Mac OS X and any other operating system with network support
- Network connection

Please note that your computer or other device must feature a network adapter with a network port.

*Please note that dLAN devices such as the devolo dLAN duo (**14 Mbps**) and devolo dLAN 85 HSplus (**85 Mbps**) can be used on the same household electrical wiring as dLAN 200 AV devices (**200 Mbps**) without interference, but they will not be able to communicate directly with one another. More **valuable information about dLAN** is available in the **Service & Support** section of our website at **www.devolo.com**.*

2.3 Functions

The dLAN 85 HSplus has three control lamps (LEDs). The device is also equipped with an integrated electrical socket and a network jack.

Illustration is country-specific.

2.3.1 Control lamps (LEDs)

Power	green	dLAN 85 HSplus is ready for operation.
	orange	dLAN 85 HSplus is in standby mode.
dLAN	green	A connection to the dLAN network exists; flashes when data is being transmitted.
Ethernet	green	A 100 Mbps or 10 Mbps connection to the Ethernet network exists; flashes when data is being transmitted.

2.3.2 Ports

- Network connection
  This is the connection point on the dLAN 85 HSplus for connecting it to a computer or another network device with the network cable (included).
- Integrated electrical socket
  If you connect additional network devices using a multiple socket, plug this multiple socket into the electrical socket of the dLAN 85 HSplus. The integrated mains filter eliminates any noise of connected devices and significantly improves data transmission in the home network.

Please note that all dLAN devices to be connected to your network are also connected to your household electrical wiring. A dLAN device switches to standby mode after a short while if no active network device such as a computer is connected to the network port. In standby mode, the dLAN device cannot be accessed via the power supply grid. As soon as the network device (e.g. computer) connected to the network interface is switched on again, your dLAN device can also be reached again via the electrical wiring.

2.4 Connecting the dLAN 85 HSplus

This section describes how to connect your dLAN 85 HSplus to a computer or to a network.

The firmware updater application can be found in the download section of our website at www.devolo.com.

① Use the included network cable to connect the dLAN 85 HSplus to the network port of your running computer or other network device.

② Plug the dLAN 85 HSplus into a wall socket.

③ Additional network devices that are connected via a multiple socket are connected to the mains power supply by plugging the multiple socket into the integrated electrical socket of the dLAN 85 HSplus.

④ Once you have connected at least two dLAN 85 HSplus adapters as described in ① and ②, your dLAN 85 HSplus network has been set up. To protect your dLAN network **individually** from unauthorised access, you should first write down the **security IDs** of the dLAN devices. This unique identifier of each dLAN device is located on the label on the housing. Then, continue with the configuration of your network as described in Chapter 3, 'Security in the dLAN'.

2.5 Software installation

2.5.1 Software for Windows

Use the installation wizard folder to set up the following software components for using the adapter with the Windows operating system:

- The **devolo dLAN Configuration Wizard** lets you set up custom encryption for your dLAN 200 AV network.
- The **devolo Informer** finds dLAN adapters in a dLAN network and displays information on the devices found.

To install the software, insert the included CD-ROM in the CD drive of your computer. If autoplay is installed on your computer, the installation will start automatically. Otherwise, open the folder with the Windows Explorer by right-clicking on **Start** and selecting **Explorer** from the context menu. Now, select your CD-ROM drive. Double-click to start the installation wizard manually.

During the installation process, you will be given the choice of installing all software components ('Standard installation') or selecting individual ones ('Custom installation').

To take full advantage of the functions of your device, we recommend installing all of the applications.

You will be asked for permission to transfer anonymous performance data related to your dLAN adapter to devolo. The data sent to devolo pertains only to the performance values of your dLAN devices. The data is anonymised and will be used exclusively for statistical purposes. By providing it, you can help us improve our products. You can find the installed software applications in the **Start** ▶ **Programs** ▶ **devolo** program group.

2.5.2 Software for Mac OS X

The **software** ▶ **mac** folder contains the dLAN configuration software.

2.5.3 Software for Linux

The **software** ▶ **linux** folder contains the dLAN configuration software.

3 Security in the dLAN

To ensure the privacy of your dLAN network, data transfer via the household electrical wiring is encrypted using the dLAN Configuration Wizard. Using another utility program, **devolo Informer**, you can gain an overview of all the reachable dLAN adapters in your own network.

3.1 Encrypting the dLAN network

Using the dLAN Configuration Wizard, you can connect multiple devolo dLAN adapters to each other to create a closed and secure home network. After successfully installing the devolo software, you can launch the dLAN Configuration Wizard in the **Start** ▶ **All Programs** ▶ **devolo** program group.

Before beginning with this step, make a note of the security IDs of all existing dLAN devices. This unique identifier of each dLAN device is located on the label on the housing. It consists of 4 x 4 letters separated by dashes (e.g. ANJR-KMOR-KSHT-QRUV). Ensure that all dLAN devices are connected to the electrical wiring and computers or other network components as appropriate.

If the dLAN Configuration Wizard cannot find a dLAN device in your network even though one is plugged tightly into a power outlet, follow the instructions for bandwidth optimisation in the Annex.

Configuring your dLANs using the dLAN Configuration Wizard consists of three steps:

① **Scan for local adapter**

After launching the wizard, it initially scans for a dLAN adapter connected directly to your computer.

② **Entering a network password**

If your dLAN adapter has been found that is reachable directly from your computer, you can select a network password in the next step to be valid for this and all other specified adapters in your personal home network.

You can choose between your own password, a random password and the default password. To define your own password with a length of at least eight characters, enter this into the **Network password (min. 8 characters)** text field. Alternatively, you can have a randomly selected, highly secure password assigned using the **Random password** button. Pressing the **Default password** key resets the password of the dLAN adapter to the factory setting. Normally,

the display of the password is hidden for security reasons. If you enable the option **Show characters**, the current password is displayed in legible form in the text field.

dLAN Configuration Wizard
Enter the network password
Define the password for your local dLAN adapter.
A dLAN adapter has been detected that is connected directly to your computer. To create a dLAN network, assign a common network password to more than one dLAN adapter.
Network password (min. 8 characters):
••••••••••
Show characters
Random password
Default password
Click 'Next' to assign the password above to the detected local adapter.
< Back
Next >
Cancel

*The factory default password is "**HomePlug**".*

Assigning a specific password to a single adapter will exclude it from the remaining dLAN network.

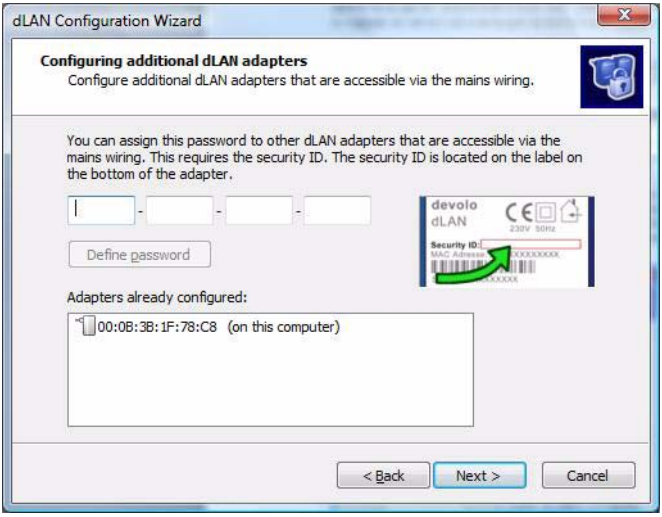
③ Configuring additional dLAN adapters (optional)

After setting up the local dLAN adapter, you can, if you want, assign the dLAN password selected in Step 2 to other dLAN devices in your network in order to form a closed dLAN network.

You will need the 16-character **Security IDs** of the various adapters from the label on the housing. Enter the code without hyphens in the 4 text boxes and confirm by clicking **Define password**. If a security ID is correct and the device is reachable in the dLAN, the device is added to the list of already configured adapters.

When launching the dLAN Configuration Wizard again after a successful initial installation—when integrating a new adapter into the network, for example—**the application will remember** devices and security IDs entered in previous sessions if you have encrypted them with a personal **network password or the default password**. In this case, you do not need to enter the devices again.

However, if the **random password** was used to encrypt the network during the last installation, if you want to integrate a new adapter into the network, you must re-register all previously entered dLAN adapters using the security ID.

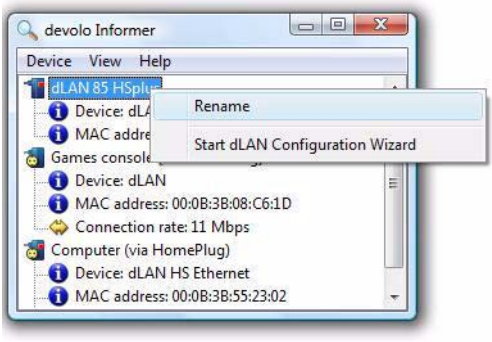

dLAN Configuration Wizard
Configuring additional dLAN adapters
Configure additional dLAN adapters that are accessible via the mains wiring.
You can assign this password to other dLAN adapters that are accessible via the mains wiring. This requires the security ID. The security ID is located on the label on the bottom of the adapter.
Define password
devolo
dLAN
Security ID:
Adapters already configured:
00:0B:3B:1F:78:C8 (on this computer)
< Back
Next >
Cancel

Once you have entered the security IDs of your dLAN adapters, your dLAN network is complete. All computers and other network devices connected to the adapters by cable should now be able to communicate with one another in the network.

3.2 devolo Informer

devolo Informer can detect all available dLAN adapters in your home network and display device information in an overview. After installing the devolo software, it can be found in the **Start** ▶ **Programs** ▶ **devolo** program group. When the Informer is launched, it initially scans your home network for all available dLAN devices. This may take a moment. All found adapters are listed with their names and MAC addresses in the overview window. Their firmware versions are also displayed, as are the transfer speeds of active connections between the adapters. devolo Informer generally updates the list of found dLAN devices automatically. If newly-added adapters do not appear in the window, refresh the display with **F5** or via the **View** menu.

Use the **Device** menu or the context menu that opens with a right-click on the name of the displayed dLAN device to rename the adapter or launch the dLAN Configuration Wizard.



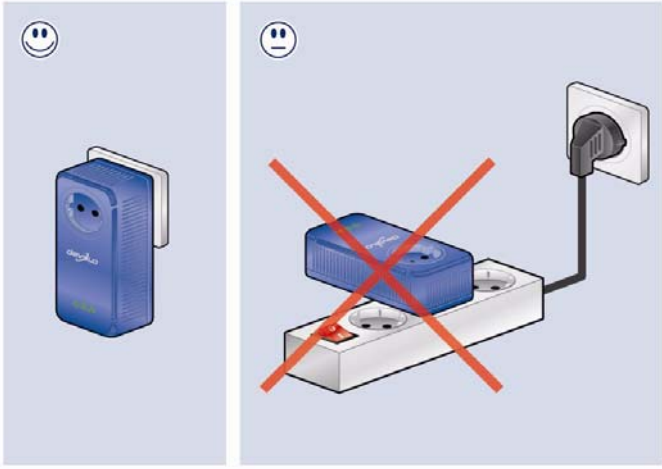
Multiple instances of devolo Informer installed in your network can be set to exchange information about found dLAN adapters under **View** ▶ **Options…**. You may also specify whether information on the performance of your dLAN adapters will be transferred to devolo here. The data sent to devolo pertains only to the performance values of your dLAN devices. The data is anonymised and will be used exclusively for statistical purposes. By providing it, you can help us improve our products.

4 Appendix

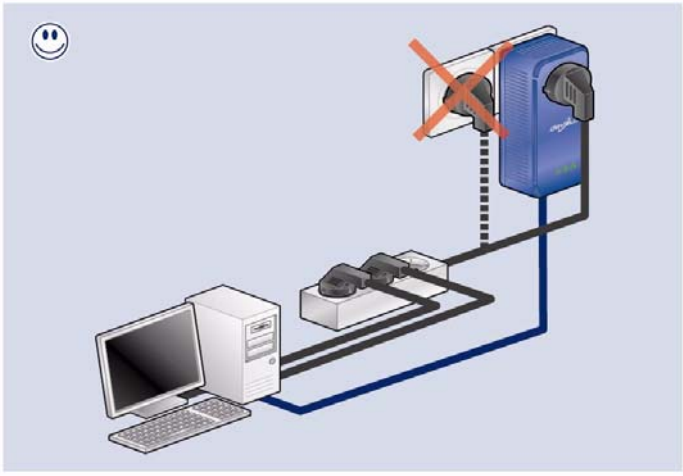
4.1 Bandwidth optimisation

To significantly improve the transmission capacity of the network, we recommend that you comply with the following "connection rules":

Plug the device **directly** into a **wall socket**. Avoid multiple sockets.



You should connect all additional network devices that are connected to a multiple socket to the mains power supply via the electrical socket integrated into the dLAN 85 HSplus. To take full advantage of the **filter function** of the dLAN 85 HSplus and to improve data transmission in the network, **always** plug the **multiple socket** into the **electrical socket** of the **dLAN 85 HSplus**.



*If you need to power more devices, use a **remote wall socket**.*

4.2 Important safety instructions

All safety and operating instructions should be read and understood before using the device, and should be kept for future reference.

- Never open the device. There are no user-serviceable parts inside the device.

Do not try to service this product yourself! Contact qualified technicians each and every time your device needs maintenance. There is a risk of electric shock!

- Use the device in a dry location only.
- Always use the included network cable to connect the device.
- Do not insert any objects into the openings of the device.
- To disconnect the device from the power supply grid, pull the power plug.
- Do not keep the device in direct sunlight.
- Slots and openings on the case serve as ventilation. Never block or cover them.
- Never set up the device near a heater or radiator.
- The device should be located only where sufficient ventilation can be ensured.
- Disconnect the device from the power supply grid before cleaning. Use a moist towel to clean the device. Never use water, paint thinner, benzene, alcohol or other strong cleaning agents when cleaning the device, as these could damage the case.
- Never use the device with a power supply that does not meet the specifications provided on the rating plate. If you do not know what type of power supply you have at home, contact your dealer or energy supplier.
- In the event of damage, disconnect the device from the power supply grid and contact customer service. This applies, for example, if
  - the power cable or plug is damaged.
  - liquid has been spilled on the device or objects have fallen into the device.
  - the device has been exposed to rain or water.
  - the device does not work, even though the operating instructions have been followed properly.
  - the device's case is damaged.

4.3 Technical data

Standards	Ethernet specifications IEEE 802.3, IEEE 802.3x, IEEE 802.3u, Auto MDI / X backward-compatible to HomePlug standard 1.0
Protocols	CSMA/CA
Transmission speed	85 Mbps
Transmission method	asynchronous
Modulation	OFDM - 84 carriers
Data path	Ethernet <-> power supply grid
Range	up to 200m over power supply grid
Security	DES_{pro} encryption over household power supply grid
LEDs	-Power -Ethernet (Link/Act) -dLAN (Link/Act/quality)
Socket / connector	DE, NL, ES, PT, AT, SW, FI, NO: Type F (CEE 7/4) / Type E + F (CEE 7/7 + CEE 7/4) FR, BE: Type E (CEE 7/7) / Type E + F (CEE 7/7 + CEE 7/4) UK: Type G (BS 1363) / Type G (BS 1363) CH: Type J (SEV 1011) / Type J (SEV 1011)
Power output at integrated socket	230 V / 16 A maximum
Device port	Ethernet RJ45
Power consumption	5 W (max.), 3,3 W in standby
Power supply	AC 100-240V 50/60Hz
Damping filter	2 – 30 MHz
Filter characteristics	-22 dB to -45 dB
Temperature	Storage: -25°C – 70°C Operation: 0°C – 40°C
Weight	240 g
Dimensions	130 x 66 x 42 mm (height x width x depth)
Ambient conditions	10–90% humidity (non-condensing)
System requirements	Ethernet interface
Operating systems	Windows® $XP_{32\text{-bit}}$, Windows® $Vista_{32/64\text{-bit}}$, Linux®, Mac OS® X and all operating systems with TCP/IP support
Certifications	CE-compliant in accordance with the technical requirements of all EU countries and Switzerland: EN 60950-1:2006 EN 55022:2006 EN 50412-2-1

4.4 Declaration of conformity

CE

KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Hersteller: Manufacturer:	**devolo AG** **Sonnenweg 11** **52070 Aachen**
Produkt: Product:	**devolo dLAN 85 HSplus**
Typnummer: Type number:	**MT 2201, 2202, 2203, 2204**
Verwendungszweck: Intended purpose:	**PLC zu Ethernet Adapter** PLC to Ethernet Adapter
Richtlinie: Directive:	**EMV 2004/108/EG** EMC 2004/108/EC

Das Produkt entspricht den grundlegenden Anforderungen und Bestimmungen der folgenden Normen und Methoden:
The product complies with the essential requirements and provisions of following standards and methods:

Sicherheitsanforderungen: Safety requirements:	**EN 60950-1:2006**
Immunitätsanforderungen: Immunity requirements:	**EN 50412-2-1**
Emissionsanforderungen gestrahlt: Emission requirements radiated:	**EN 55022:2006**
Emissionsanforderungen leitungsgebunden: Emission requirements conducted:	**TCF vom Notified Body** TCF from Notified Body

Diese Erklärung wird verantwortlich abgegeben durch:
This declaration is submitted by:

Aachen, 14. Januar 2009
Aachen, 14th January 2009

Heiko Harbers
Vorstandsvorsitzender
CEO

4.5 Warranty conditions

The devolo AG warranty is given to purchasers of devolo products in addition to the warranty conditions provided by law and in accordance with the following conditions:

1 Warranty coverage

a) The warranty covers the equipment delivered and all its parts. Parts will, at devolo's sole discretion, be replaced or repaired free of charge if, despite proven proper handling and adherence to the operating instructions, these parts became defective due to fabrication and/or material defects. Alternatively, devolo reserves the right to replace the defective product with a comparable product with the same specifications and features. Operating manuals and possibly supplied software are excluded from the warranty.

b) Material and service charges shall be covered by devolo, but not shipping and handling costs involved in transport from the buyer to the service station and/or to devolo.

c) Replaced parts become property of devolo.

d) devolo is authorized to carry out technical changes (e.g. firmware updates) beyond repair and replacement of defective parts in order to bring the equipment up to the current technical state. This does not result in any additional charge for the customer. A legal claim to this service does not exist.

2 Warranty period

The warranty period for this devolo product is three years. This period begins at the day of delivery from the devolo dealer. Warranty services carried out by devolo do not result in an extension of the warranty period nor do they initiate a new warranty period. The warranty period for installed replacement parts ends with the warranty period of the device as a whole.

3 Warranty procedure

a) If defects appear during the warranty period, the warranty claims must be made immediately, at the latest within a period of 7 days.

b) In the case of any externally visible damage arising from transport (e.g. damage to the housing), the person carrying out the transportation and the sender should be informed immediately. On discovery of damage which is not externally visible, the transport company and the sender are to be immediately informed in writing, at the latest within 3 days of delivery.

c) Transport to and from the location where the warranty claim is accepted and/or the repaired device is exchanged, is at the purchaser's own risk and cost.

d) Warranty claims are only valid if a copy of the original purchase receipt is returned with the device. devolo reserves the right to require the submission of the original purchase receipt.

4 Suspension of the warranty

All warranty claims will be deemed invalid

a) if the label with the serial number has been removed from the device,

b) if the device is damaged or destroyed as a result of acts of nature or by environmental influences (moisture, electric shock, dust, etc.),

c) if the device was stored or operated under conditions not in compliance with the technical specifications,

d) if the damage occurred due to incorrect handling, especially to non-observance of the system description and the operating instructions,

e) if the device was opened, repaired or modified by persons not contracted by devolo,

f) if the device shows any kind of mechanical damage, or

g) if the warranty claim has not been reported in accordance with 3a) or 3b).

5 Operating mistakes

If it becomes apparent that the reported malfunction of the device has been caused by unsuitable hardware, software, installation or operation, devolo reserves the right to charge the purchaser for the resulting testing costs.

6 Additional regulations

a) The above conditions define the complete scope of devolo's legal liability.

b) The warranty gives no entitlement to additional claims, such as any refund in full or in part. Compensation claims, regardless of the legal basis, are excluded. This does not apply if e.g. injury to persons or damage to private property are specifically covered by the product liability law, or in cases of intentional act or culpable negligence.

c) Claims for compensation of lost profits, indirect or consequential detriments, are excluded.

d) devolo is not liable for lost data or retrieval of lost data in cases of slight and ordinary negligence.

e) In the case that the intentional or culpable negligence of devolo employees has caused a loss of data, devolo will be liable for those costs typical to the recovery of data where periodic security data back-ups have been made.

f) The warranty is valid only for the first purchaser and is not transferable.

g) The court of jurisdiction is located in Aachen, Germany in the case that the purchaser is a merchant. If the purchaser does not have a court of jurisdiction in the Federal Republic of Germany or if he moves his domicile out of Germany after conclusion of the contract, devolo's court of jurisdiction applies. This is also applicable if the purchaser's domicile is not known at the time of institution of proceedings.

h) The law of the Federal Republic of Germany is applicable. The UN commercial law does not apply to dealings between devolo and the purchaser.

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